

## IITA improving maize genotyping workflow in developing countries

With growing concerns around food and nutrition security globally due to the Ukraine–Russia war, there is also an increased need for improving food systems through research.



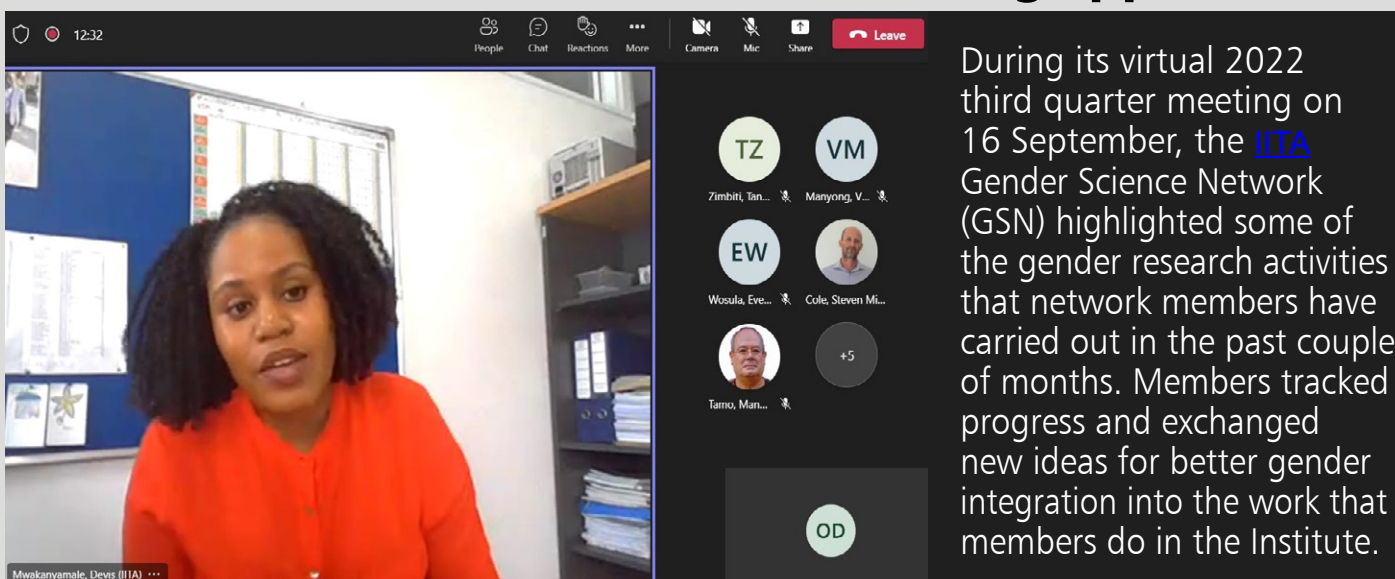
IITA Maize Improvement Program has successfully developed Striga-resistant, provitamin-A-enhanced, and early maturing varieties.

With a mandate to transform agriculture and increase food production sustainably, [IITA-CGIAR](#) researchers are consistently delivering technologies that impact the livelihood of smallholder farmers.

Using genetic engineering and selective breeding, IITA-CGIAR is developing a wide range of staple varieties and biofortified crops that address hunger and micronutrient deficiencies. Maize, one of the most important cereal and staple crops in sub-Saharan Africa (SSA), accounts for about 50% of low-income household expenditure and is a good source of protein, carbohydrates, minerals, vitamins, and dietary fiber. Maize provides over 30% of caloric intake for more than 300 million Africans.

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## GSN to reach wider audience with training opportunities



During its virtual 2022 third quarter meeting on 16 September, the [IITA](#) Gender Science Network (GSN) highlighted some of the gender research activities that network members have carried out in the past couple of months. Members tracked progress and exchanged new ideas for better gender integration into the work that members do in the Institute.

Sarah Msita, Gender Research Assistant under the HER+ Initiative at IITA Tanzania, introducing herself as a new network member.

IITA Gender Specialist and GSN Coordinator, [Steven Cole](#), talked about major events happening within the [One CGIAR](#). He highlighted that the Bill & Melinda Gates Foundation made their support official for the first business cycle of the [Harnessing Equality for Resilience in the Agrifood System \(HER+\)](#) project—a gender and social inclusion initiative. He explained how this gives confidence that other potential donors will come in. Cole also stated that many gender researchers are now being hired across different centers, including IITA.

Insect Ecologist [Manuele Tamo](#) spoke on his involvement in the Feed the Future Innovation Lab for legume system research. He also mentioned that he is supervising a PhD student whose work focuses on social, economic adoption, gender, and impact studies. Africa RISING East and Southern Africa (ESA) Project

Economist, [Julius Manda](#), spoke about the Sustainable Intensification of Mixed Farming Systems (SIMFS) initiative, stating that it is firmly gender-focused and looks more into gender transformative approaches.

Agricultural Economist [Shiferaw Feleke](#) highlighted the mixed methods project he and Cole are working on in collaboration with other partners from the [International Food Policy Research Institute](#) (IFPRI) and the University of Dar es Salaam. He said that the team is currently assisting the African Cassava Agronomy Initiative (ACAI) project to analyze data collected on gender differences in the production system, market access, commercial orientation, and uptake and use of [AKILIMO](#) stores in Tanzania and Nigeria. Gender Intern Tanaka Zimbite shared her work with Agricultural Economist (Foresight Modeler) [Sika Gbegbelegbe](#) and the Malawian team on a systematic

literature review on the gender aspect of banana consumer and producer preferences. “The team also organized a gender-responsive redo training from 21 to 23 September,” she said.

IITA Gender Communication Specialist, Ochuwa Favour Daramola, mentioned that the Gender Talk Show would soon be back to promote gender work on Radio IITA and IITA TV. She also asked participants to share their reports so that their activities could get more visibility through stories published on IITA news outlets and posts on institutional social media platforms.

Cole gave an update on gender integration in the new One CGIAR initiatives. He talked about the Gender Science Exchange Fair that will take place in Nairobi and the launch of the HER+ initiative to be held a week before the science exchange, where all Gender Research Coordinators will meet. Cole also mentioned the gender-responsive extension and agriculture for transformation program, where IITA will work with agronomists to develop gender research capacity. “This will also involve Makerere University in Uganda and Cornell University in the US,” he added.

Closing the meeting, Cole noted that the next gender research webinar series would come up in October. He also responded to a member’s suggestion to find a way of reaching more people with the webinars and training opportunities. He assured the team that such opportunities will reach the Communication and Capacity Development offices for more visibility.

*Contributed by Ochuwa Favour Daramola*



*Gender Specialist and GSN Coordinator, Steven Cole, anchoring the meeting.*

## Got a story to share?

Please send your story with photos and captions every Tuesday to [iita-news@cgiar.org](mailto:iita-news@cgiar.org) or Katherine Lopez ([k.lopez@cgiar.org](mailto:k.lopez@cgiar.org)) and Uzoma Agha ([u.gha@cgiar.org](mailto:u.gha@cgiar.org)).



At IITA, the Maize Improvement Program has recorded remarkable success developing Striga-resistant, provitamin-A-enhanced, and early maturing varieties, enabling maize production to expand into new areas in SSA. However, with biotic and abiotic constraints causing losses both on the field and postharvest, there is a need for genetic improvement of maize, which would address nutrition quality, yield potential, and disease and pest resistance, among other issues.

As part of efforts to accelerate maize improvement in developing countries, scientists from IITA's Bioscience Center and the Maize Improvement Program researched DNA fingerprinting for tracking improved crop varieties and assessing the effective application of genetic diversity in maize to understand the population structure and genetic

variability among 439 early and extra-early maize inbred lines.

The study highlighted various bottlenecks that have hindered the substantial impact of molecular breeding for crop improvement, particularly in developing countries. Despite this, the improved workflow from the study can help National Agricultural Research Systems in developing countries to fast-track molecular marker-based genotyping for crop improvement.

Some of these bottlenecks, such as logistics, shipping costs, and inefficient courier services, which often result in reduced or damaged perishable specimens, can be avoided if a reasonably affordable system is available locally.

According to the study, two quality

control (QC) and marker-assisted selection (MAS) experiments consisting of 637 maize lines were performed using an optimized genotyping workflow involving an in-house competitive allele-specific PCR (KASP) genotyping system with an optimized sample collection, preparation, and DNA extraction and quantitation process.

Also, a smaller volume of leaf-disc size plant samples was collected directly in 96-well plates for DNA extraction, using a slightly modified Cetyltrimethylammonium Bromide (CTAB)-based Diversity Array Technology (DArT) DNA extraction protocol. The DNA quality and quantity analyses were performed using a microplate reader, and the KASP genotyping and data analysis were performed in a laboratory at IITA.

With the study, an improved genotyping workflow promises to accelerate the marker-assisted selection process and push crop improvement activities to attain better yield potential over a shorter period.

Molecular breeding is an essential tool for accelerating genetic gain in crop improvement toward feeding an ever-growing population in Africa and across the world. With the high cost of carrying out breeding research, establishing low-cost, flexible genotyping platforms in small, public, and regional laboratories can stimulate the application of molecular breeding in developing countries. These laboratories can serve plant breeding projects requiring low-to medium-density markers for MAS and QC activities. *Contributed by Timilehin Osunde and Iyaniwura Savage*



Prepping maize in a laboratory at IITA.

## IITA hosts expert workshop on trade, innovation, and entrepreneurship for improved FNSSA

Under the [Long-term EU-AU Research and Innovation Partnership for Food and Nutrition Security and Sustainable Agriculture \(LEAP4FNSSA\)](#) project, IITA hosted agrifood experts from 13 organizations from Africa and Europe to discuss two recently conducted studies to understand the impact of trade, innovation, and entrepreneurship for improved food and nutrition security and sustainable agriculture (FNSSA).

The expert workshop, facilitated and hosted by IITA Ghana, took place on 13 September.

The experts and other key stakeholders discussed the findings from a study on agrifood trade between Europe and Africa. They also reviewed another research on [innovation and entrepreneurship](#) with particular reference to gender and youth led

by IITA Sahel Africa Hub Director [Abdoulaye Tahirou](#). The authors of both studies and four invited experts discussed the findings of the studies and their implications for improved FNSSA. IITA Consultant Dr Mastawel Yami presented the IITA-led study report.

Thirty-six stakeholders attended the hybrid workshop, with 29 participating on location and seven virtual participants. IITA's Young Africa Works Executive Manager [Aline Mugisho](#) and Monitoring, Evaluation and Learning Manager Oyewale Abioye led the physical facilitation of the workshop while Head of IITA Capacity

Development Office, [Zaina Sore](#), led the hybrid version.

After a presentation of each study, the experts deliberated on the findings, followed by a general discussion among participants. In the afternoon, the expert workshop facilitated a discussion to enrich the recommendations (based on the studies' findings and the feedback) for strengthening the foundations of the Africa-Europe International Research Consortium Platform (IRC).

At the end of the event, the participants agreed on the need to develop evidence-based pathways for policy, engage with financial institutions,

and map the performance of earlier projects to take advantage of previous experiences. Since the LEAP4FNSSA project was coming to an end, leading to the establishment of a bicontinental platform named the International Research Consortium (IRC), the primary recommendation for the IRC was to connect different levels of scale and consider local contexts and comparative advantages of specific countries and specific crops. They also recommended investing in a transformative gender and youth approach that would enhance the inclusion and capacities of women and youth in research and innovation.

*Contributed by Oyewale Abioye*



*Top: Stakeholders at the LEAP4FNSSA workshop. Bottom: Participants during one of the workshop sessions.*

## Over 50 scientists and science communicators trained to communicate on genome editing

The Alliance for Science (AFS), in conjunction with the Open Forum for Agricultural Biotechnology (OFAB) Nigeria, Boyce Thomson Institute, and [IITA-CGIAR](#), organized a 3-day training for scientists and science communicators on Communicating Gene Editing in Abuja, Nigeria. The training took place on 19–21 September and aimed to provide participants with the appropriate communication skills to communicate on gene editing for food sustainability, nutrition, and security in Africa.

In his opening remarks, Head of IITA Abuja Station and BASICS II Project Lead, Sanni Lateef, encouraged the next generation of scientist-participants to exceed the achievements of the older scientists in terms of scientific research and innovations. “Science is evolving, and we need a new generation of science inventors to keep up with it,” he said.

OFAB Country Coordinator Dr Rose Gidado and IITA Plantain

Transformation Scientist Valentine Ntui explained the science of gene editing. They pointed out that genome editing is a revolution for science and medicine that takes advantage of the cell’s DNA repair mechanisms, resulting in many different molecular outcomes.

TIIRA CEO and inventor, Dr Joseph Nderitu from Kenya, discussed how science innovations could become a money-making venture when patented, and not just for research purposes. He advised scientists and researchers who have original ideas and innovations in science to “own their inventions” by patenting them.

Deputy Director Alliance for Science, Patricia Nanteza, who joined the workshop online, highlighted the objective of the training, which is to ensure scientists and science communicators can communicate scientific issues, including gene editing in plant breeding, to the public. She also shared step-by-step instructions on how participants can develop a

communication framework that will enable them to effectively relay their messages to the stakeholders.

The participants had break-out sessions with communication experts for practical demonstration of their acquired knowledge. They were also asked to produce communication materials using various media, including print (news and opinion writing), social media, radio, and TV.

At the end of the training, participants went on a field trip to the National Biotechnology Development Agency (NABDA) to visit their biotech lab, bioinformatics center, and field trials.

A young participant from Agserver, Joy Oपुरo, commended the organizers and said the training was impactful and of great value. “I look forward to sharing my newfound knowledge on gene editing. It is a game changer with numerous benefits for farmers and food security in Africa,” she said.

*Contributed by Dajie Odok*



Scientists and science communicators at the Gene Editing Communication training.

# SISCA analyzes results of inventory of cassava and maize seed sectors in DRC

Stakeholders in the Democratic Republic of Congo (DRC) organized a workshop to analyze the results of studies on the cassava and maize seed sectors. The workshop, under the Strengthening the Supply of Improved Seeds in Central Africa (SISCA) Regional Project, took place in Goma, on 29 and 30 August, in the province of North Kivu.

Based on the studies' conclusions, the workshop recommended:

- The establishment of a public–private partnership model in the seed sector.
- The design of the seed traceability model.

- The revitalization of a consultation framework called the Provincial Council on Seeds (COPROSEM) to be developed in Goma, bringing together leading players in the seed sector (60% for the private sector, 40% for the public sector). The relevant branches will

be established in all provinces of the country.

- The set up of a competitive and accessible seed market, with seeds of available varieties adapted to the farming environment and valued by farmers.

[IITA-CGIAR](#) also hosted a meeting between SISCA and the Support Program for Inclusive and Resilient Rural Development (PADRIR), all funded by IFAD, to finalize the Framework and the Harmonization Protocol relating to joint activities between both parties. *Contributed by Michèle Kimpwene*



Participants at the SISCA and PADRIR meeting hosted at IITA.

## Take responsibility! Stop the spread of COVID-19!

Always clean your hands; practice physical and social distancing; wear face masks properly; avoid crowds and public places; keep a 2-meter distance from the next person; and practice general sanitation and hygiene.